Workshop Summary Report:

Seminario Internacional: Nuevos Enfoques de la Fiscalización Ambiental / Next Generation Compliance

August 9-10, 2016
Santiago, Chile

Submitted to:

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Executive Summary

The *Seminario Internacional: Nuevos Enfoques de la Fiscalización Ambiental* workshop took place at the Hotel Plaza San Francisco in Santiago de Chile from August 9-10, 2016. The workshop was organized by Chile's Superintendency of the Environment (SMA, using its acronym in Spanish), with support from the U.S. Environmental Protection Agency (EPA). The workshop included over 100 participants from Chile, Brazil, Colombia, Panama, Peru, and the United States. The National Network of Environmental Enforcement (RENFA using its Spanish acronym) in Chile and the South American Enforcement and Compliance Network (REDSUFICA, using its acronym in Spanish) were also present.

The workshop focused on collaboration across networks, both nationally and internationally, and the use of innovative, modern techniques and technologies to improve compliance and enforcement across sectors. The workshop was largely organized around the five interconnected components of the EPA's *Next Generation Compliance Strategy*. These components are:

- Regulations and permit design
- Advanced emissions/pollutant detection and monitoring technology
- Electronic reporting
- Transparency
- Innovative Strategies for Enforcement

Presentations were presented in four modules focused on challenges and opportunities in enforcement and compliance, development of new tools, electronic reporting, and innovation. Participants from various countries presented case studies on information management systems, technologies for monitoring and visualizations, or how challenges have been overcome. No specific next steps were identified, however all workshop participants were encouraged to consider bringing innovative methods of sharing information, monitoring, and evaluation into their compliance and enforcement activities. Participants were also encouraged to participate in regional networks and maintain and build the community of compliance and enforcement professionals throughout Latin America.

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1. Introduction

The *Seminario Internacional: Nuevos Enfoques de la Fiscalización Ambiental workshop* took place at the Hotel Plaza San Francisco in Santiago de Chile from August 9-10, 2016. The workshop was organized by Chile's Superintendency of the Environment (SMA, using its acronym in Spanish), with support from the U.S. Environmental Protection Agency (EPA). The workshop included over 100 participants from Chile, Brazil, Colombia, Panama, Peru, and the United States. The National Network of Environmental Enforcement (RENFA using its Spanish acronym) in Chile and the South American Enforcement and Compliance Network (REDSUFICA, using its acronym in Spanish) were also represented.

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- Regulations and permit design
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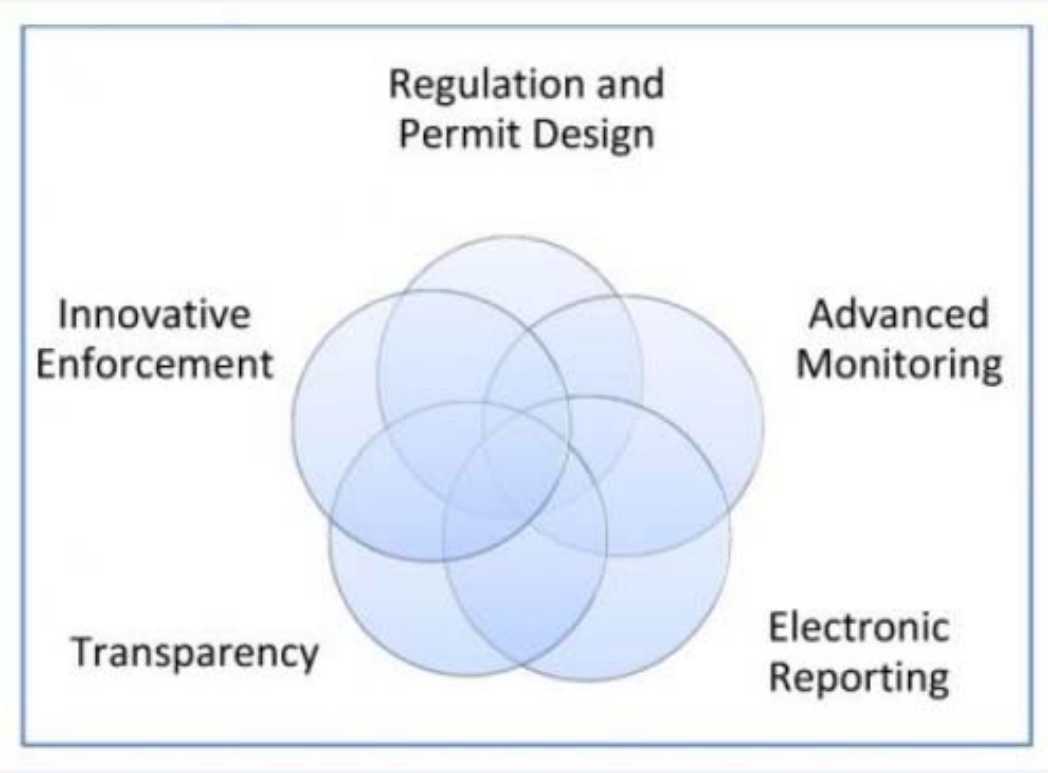

Figure 1. Next Generation Compliance Components

The *Next Generation Compliance Strategy* was developed by the EPA and has been widely promoted through the International Network for Environmental Compliance and Enforcement (INECE). *Next Gen Compliance* emphasizes regulatory design utilizing new technological advances for monitoring, analyzing, and mitigating environmental contamination. Modern tools and methods allow for data to be collected efficiently and in real-time.

Considering this shift in global enforcement and compliance, SMA is similarly seeking to integrate the *Next Generation Compliance Strategy* into its national standards for environmental stewardship. Similarly, SMA is supporting the National Network of Environmental Enforcement (RENFA, using its acronym in Spanish), a national network of Chilean enforcement and compliance agencies, as well as REDSUFICA, the South American Environmental Enforcement and Compliance Network – to ensure that they can modernize their techniques in these areas, as well.

The objective of the workshop was to allow stakeholders, international partners, and network participants to share their experiences, new technologies, methods, and results obtained during recent years using the logic of the *Next Generation Compliance Strategy.*

To achieve this objective, the workshop was organized into four modules:

1. New Approaches in Environmental Enforcement and Compliance: Challenges and Opportunities
2. Development of Tools for Environmental Enforcement
3. Impact of Electronic Reporting in Environmental Compliance
4. Innovation in Environmental Enforcement

Each module was composed of individual presentations by various speakers, followed by a panel discussion in which the speakers answered questions from the audience. The workshop was conducted in Spanish. The workshop was organized by SMA with coordination and funding contributed by the EPA. Workshop presentations are available online here: http://renfa.sma.gob.cl/index.php/2016/07/14/seminario-internacional-nuevos-enfoques-de-la-fiscalizacion-ambiental/

2. Workshop Welcome

The workshop began with introductions and words of welcome by three high-ranking officials within the governments of Chile and the United States. Cristian Franz, the Superintendent of SMA, opened the workshop with a summary of the importance of collaboration and continued learning in the area of enforcement and compliance. He noted that SMA is working toward implementing elements of the *Next Generation Compliance Strategy* at the national level but will continue to rely on the experiences of others across the region and beyond, including the EPA. The network of compliance professionals must continue to collaborate, share experiences, and build on each other's experiences to improve environmental protection. Many South American countries face similar industries and pollutants and should share goals and practices in implementing enforcement and compliance strategies.

Next, Pablo Badenier, the Minister of Environment, provided a description of Chile's SMA. He noted that it is a relatively young agency working in a coordinated manner for a cleaner

environment. Though it started with only three regional offices, they now have offices in all regions of the country. He noted that coordination between services – such as infrastructure and social services – is important and serves to improve the environmental enforcement network. Technologies such as remote monitoring (satellite and ground-based) provide better data for analysis on atmospheric contaminants, leading to improved enforcement efforts. Without environmental enforcement, environmental contamination cannot be reduced in a meaningful and assured manner. The workshop brings together broad experience to work toward advancing and strengthening enforcement and compliance efforts using improved monitoring and, therefore, data.

Finally, Dale B. Eppler, The Deputy Chief of Mission at the United States Embassy, spoke briefly and focused on the important relationship between Chile and the United States, especially between the SMA and the EPA. He noted that the two countries have shared bilateral cooperation since 2003; the relationship is a good example of successful collaboration supported by free trade and strong environmental laws. The technical exchanges that occur between Chile and the United States improve both countries.

3. Module 1: New Approaches of Environmental Enforcement and Compliance: Challenges and Opportunities

Plenary Session: Challenges and Opportunities from a Local Perspective

The first module of the workshop began with a short presentation by Cristian Franz on the *Next Generation Compliance Strategy,* introducing again the five integrated elements (see Figure 1). Mr. Franz emphasized that these pillars are integrated and must be coordinated across technical organizations through a network. REDSUFICA may be a perfect place to strengthen work and bring new technologies – such as cameras, monitors, and other means of gathering information – to bear for addressing challenges.

The first presenter was Gianfranco Mejia, the Director of Enforcement, Sanctions, and Application of Incentives within the Organization of Evaluation and Environmental Enforcement (OEFA) of Peru. Mr. Mejia spoke about the work that OEFA has been pursuing related to information and data, including analyzing historical data on water, residuals, and contaminants, and comparing these findings to newly attained data to help determine a baseline. He emphasized the need for increased transparency and coordination across sectors. For example, environmental standards for businesses should be consistent and enforced across sectors such as water, waste, or others. He also stated his agency's desire to prioritize their efforts based on the *Next Generation Compliance Strategy*.

Next, Andrew Griffin, the U.S. Regional Director for Environment, Science, Technology, and Health in South America, presented an example of transparency and access to information that had a real-time impact. He discussed the example of poor air quality in China and the impact that contamination has on families and human health. There had been a lack of information about air quality, despite Chinese state air quality monitoring efforts. The Embassy of the U.S. took this opportunity to focus on access to information and placed air quality monitors on its property and created a platform to share data about the air quality index (AQI). Data was shared through Twitter and online through other platforms. While the Chinese government was not supportive at first, eventually they also started publishing air quality information obtained

through their own monitors. Air quality became a basis for communication and cooperation between China and the U.S. Mr. Griffin explained that this important example shows elements of the *Next Generation Compliance Strategy* model– information and technology in particular – and how they can impact human health and even politics.

Jose Miguel Burgos, the Director of the National Service of Fish and Aquaculture (SERNAPESCA) of Chile, presented on a similar model using facets of the *Next Generation Compliance Strategy.* In its case, SERNAPESCA has started with the generation of laws as a means of creating impact. From there, technologies can be applied as appropriate, such as drones or cameras. Improving communication of data for use in laws and regulatory systems means collaborating across agencies. Addressing risk must be an integrated effort across sectors and agencies. The end goals are sustainable use of natural resources and changing peoples' attitudes on how they see their role in protecting the environment.

The final presentation was provided by Mr. Jair Schmitt, the General Coordinator of Environmental Enforcement of the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA, using its acronym in Portuguese). Mr. Schmitt described Brazil's efforts to organize enforcement activities across federal, state, and municipal levels. The system must be well-articulated in order for enforcement to be successful across levels, including delineation of responsibility. Federal officials and agencies must lead and instruct – as they are doing in the case of Amazonian deforestation in Brazil, the biggest environmental issue the country is facing currently. Enforcement and compliance, and the associated legal activities and repercussions, he argued, are the first means of addressing illegal activities. Transparency in government is still a challenge in Brazil, as is the use of technology for more and better information and data.

Keynote Address: Strategies of Next Generation Compliance

Davis Jones, the Acting Director of the EPA's International Compliance Assurance Division in the Office of Enforcement and Compliance Assurance (OECA), provided the Keynote Address on the *Next Generation Compliance Strategy.* He noted that EPA has an important but limited role in addressing contamination of air, water, and land, but not a strong role in protecting land, forests, fish, etc.; therefore, the EPA is set up differently than the SMA. While the EPA may conduct investigations and research, develop regulations, and produce standards and protocols for analysis, the actual enforcement of laws occurs at either the State or Federal level depending on the particular situation. He described EPA's role in enforcement and the challenge in dealing with this complexity. For example, after the Deepwater Horizon oil spill in the Gulf of Mexico, various stages of enforcement and compliance had different effects on the company; British Petroleum (BP) dealt with criminal sanctions, civil damages, and administrative penalties.

Mr. Jones also referred back to the five components of the *Next Generation Compliance Strategy* and the importance of conceptualizing the elements in an integrated way. Regulation and permit design refers to the need to design permits that can be followed and enforced. Advanced monitoring entails using new technology. Innovative enforcement means using or experimenting with new strategies and tools. The EPA has presented these ideas through trainings and workshops around the world, and has been able to develop guidelines for effective regulations, as follows:

- Simplifying ways to be in compliance by making laws, regulations, and permits clear and easy to follow
- Making it easy to determine if laws are being followed

- Monitoring and informing the public
- Using electronic reporting
- Using market forces and economic incentives that encourage the public or industry to comply

In general, technological advances should “make the invisible visible” by producing and providing new information and data, and sharing the data in innovative ways. The private sector is already creating mobile phone or software applications and other advances for monitoring air quality and contaminants, for example. Similarly, tools for improved communication can ensure that the data is shared appropriately. Pursuing transparency may involve publishing data online in a map interface, for example. Indonesia publishes a list of businesses that are regulated by environmental laws. Color coding schemes display risk and compliance status. Non-governmental organizations (NGOs) may also help in publishing information if the government does not. For example, NGOs may take the EPA or the SMA information and publish it in ways that the public can easily understand, without analysis or opinion. More data – in understandable and accessible formats – can lead to public pressure for increased compliance.

Panel Discussion

A number of questions about the presentations were raised during the panel discussion. The first question related to how *Next Generation Compliance* worked in a real-world example, including how each component was met. Davis Jones noted that there have been several studies on the subject but it was difficult to demonstrate changes over regulations. He also stated that one of the problems his agency has confronted has been a lack of resources to conduct enough random inspections to create statistically valid data on compliance rates to perform the proper type of validation on changes in behavior in the regulated community. He stated that his agency has to prioritize their resources into finding and enforcing serious violations above other things. Finally, he recommended that the audience follow industry publications and magazines as a resource of real-life examples of regulations in action.

Another question related to the model for implementing regulations with new technologies and methodologies for enforcing them, and the reaction of industry. One of the panelists mentioned that the main concern from private industry has been the cost to their operations. The panelist also mentioned that there has been a positive reaction to the new monitoring technologies available, since the technologies make it easier and more convenient to remain compliant. Sanctions for breaking the rules, or even the threat of sanctions, helps to motivate them to change course and look for new ways to remain compliant. Davis Jones mentioned that the economic benefits to remaining compliant must outweigh any profit to do the opposite, and that the threat of the possible sanction for doing something bad must be severe enough to dissuade the unwanted behavior from companies. Otherwise, companies might “cut corners” in hopes of never being caught. He added that regulatory enforcement agencies should encourage, but can not force companies to go above and beyond the laws and regulations, but that the USEPA has been successful at negotiating settlements that rectify the violation and include projects that bring environmental benefits or increased transparency beyond the minimum requirements.

The next question related to how Chile and Peru are investing in monitoring programs to assist with regulatory compliance and enforcement efforts, in particular Chile’s OBSERVAR (Spanish for “to observe”) program. The panelist from Peru stated that the compliance monitoring system that was implemented monitors all regulated sectors. The initial findings are that some sectors are more compliant than others. Given the initial results, Peru plans to prioritize resources to

address the biggest offenders first. The current programs in place are funded by both public funds and by a percentage of the fines applied to offenders.

The panelists from Chile commented that the OBSERVAR program came about due to the severity of the non-compliance of a company in a rural community. The residents of the local area complained about the abuses of the company to authorities, and it was decided that as part of the resolution cameras would be installed inside the buildings of the company to stream a live feed online so the residents could keep an eye on the operations of the offending company. It was emphasized that this was an extreme example and that enforcement agencies should try to avoid this type of intrusion into a company's operations whenever possible. Finally, a representative of Chile's fishing regulating agency commented that the biggest change for them has been obtaining newer equipment (e.g. better boats, etc.) to better enforce regulations. He mentioned that 70% of their funding comes from imposed fines and the rest comes from public funds.

The next question was about how the EPA coordinates with other federal agencies when implementing *Next Generation Compliance* activities. Davis Jones stated that at the federal level it is clear which agency is responsible for what activity, therefore inter-agency collaboration is straightforward. A more important issue in the U.S. is the interaction and cooperation between the Federal and State governments which sometimes gives rise to conflicts since both governments share the responsibility of creating, implementing, and enforcing regulations. This has led to some issues in the past, but over time mechanisms have been developed to resolve these, primarily through an annual agreement between both the state and the EPA as to what to focus on for that coming year.

The final question related to numbers of permits: currently in Chile there are approximately 15,000 environmental permits/licenses issued and of these, only 850 of them are being actively supervised. The question holder requested that Colombia, Peru, and the U.S. share their numbers with the group. Davis Jones stated that the state governments have the primary responsibility for enforcing the regulations, and each state has its own goals while EPA works on the most significant issues of national importance. The Peruvian panelist commented that their goal is to regulate 100% of their permits/licenses but that they are not there yet. The Colombian panelist stated they have approximately 1,500 issued licenses and monitor about 50% of them. The Colombian panelist added that they have a national centralized authority with 30 regional offices, similar to the U.S., to handle enforcement activities.

4. Module 2: Development of Tools for Environmental Enforcement

Module 2 was introduced by Iván Honorato of the SMA, who presented on the various regional and national networks. He described the organizations of RENFA and REDSUFICA, as well as their general mandates and organization. He described the ways in which their activities lead to improved environmental management in Latin America, through collaboration on and communication of new tools, methods, means of electronic reporting, and other innovative strategies. The rest of the module was made up of presentations on case studies or examples as they related to the module theme. The presentations were followed by a panel discussion moderated by Mr. Honorato during which presenters took questions from the audience.

Presentation: Advanced Technology for Monitoring Air Emissions

Armando Bustamante, an Environmental Engineer with EPA's National Enforcement Investigations Center (NEIC), presented examples of how they are enacting *Next Generation Compliance* in relation to innovative technologies for air emission monitoring. NEIC is an office made up of inspectors and a laboratory dedicated to enforcement activities related to air quality, clean water, and hazardous waste laws. Mr. Bustamante explained the advanced monitoring tools that NEIC has begun using for the detection of air emissions, including detectors, infrared cameras, and remote monitors. Contaminants are otherwise difficult to monitor because they are invisible; however with the new infrared cameras, many volatile organic pollutants can be viewed and recorded visually. Laws allowing and promoting the use of advanced technology are changing and becoming more common. Private sector technologies are also being increasingly utilized. GMAP (Geospatial Measurement of Air Pollution) is a system that can link air monitoring data with the direction of wind and how it impacts air contaminants, while adding GPS, cartography elements, and telemetry. Maps are produced that show the sources of emissions along the route of the truck carrying the GMAP tools. NEIC is also developing ways to use LiDAR to see particulate information, however other satellite products are not being utilized because they do not produce quantitative data of surface level contamination. In conclusion, he emphasized that monitoring can be efficient, provide good protection, and provide for the public good through increased compliance.

Presentation: Automated Enforcement of Catalytic Vehicles: The Case of Santiago, Chile

Paula Flores, the Executive Secretary of Enforcement of Transport in the Ministry of Transportation and Telecommunications of Chile, presented the case of automated enforcement of vehicular contaminants in Chile. She described her organization as being part of the Ministry of Transportation, created to combat vehicular emissions in Santiago from vehicles (including cars and buses), enforce use of seatbelts, parking, public transportation services (including frequency of buses, etc.), and subsidies for transportation-related services. The Ministry is currently investigating how to meet needs related to enforcement of mobile sources, potentially using a platform of technologies including networks of cameras, communication networks, and software for managing infractions, signs that show an area is being monitored, new means of processing infractions, and new systems providing automatic citations (using photos of vehicles). Ms. Flores noted that, with these new advances, they expect drivers will respect vehicle restrictions, that numbers of infractions and accidents will decrease, and that traffic-related air pollution will be reduced.

Presentation: Environmental Enforcement in the Amazon from the Perspective of Next Generation Compliance

Jair Schmitt's (IBAMA) presentation focused on the issue of Amazonian deforestation. He noted that 60% of Brazil is considered to be a part of the Amazon; 24 million people live in this territory. However, deforestation is occurring for agriculture, livestock, and mineral extraction, with obvious ramifications for biological and social reasons. Mr. Schmitt outlined how IBAMA is considering this problem from the perspective of *Next Generation Compliance.* First, regulations are broad; forestry laws provide registries of rural areas, control of forest product production, reforestation, and market environmental services. Deforestation is monitored using advanced monitoring systems. Specific spatial and temporal resolutions as well as other image types are of particular use for this analysis. IBAMA is also trying to leverage an agreement among the

private sector, government, and NGOs to facilitate monitoring system improvements. Electronic reporting also provides alerts about deforestation levels. When an alert is issued, the message is passed through the operations base to a particular team, which identifies the issue, adjudicates the appropriate sanction, and conducts outreach for public awareness. Transparency is pursued by active public outreach campaigns. Finally, IBAMA is investing resources in developing innovative ways of enforcement by measuring and taking into consideration the economic value of not complying.

Mr. Schmitt emphasized how applying the logic leads to practical applications. IBAMA follows the approach of gathering information, conducting analysis, applying sanctions, and sharing via public outreach campaigns. Adding market values allows people to understand the impact of the non-compliance, and the need for enforcement. Connecting to outreach allows the public to better understand which markets or industries to support, and which to avoid, based on their compliance with environmental laws.

Presentation: Special Studies in Mining Activities in Peru

Giuliana Becerra, the Director of Supervision and Evaluation of OEFA in Peru, began her presentation on Peruvian mining with the broad context of the national system of environmental management, a network of five organizations working together on environmental analysis and protection. She also described the macro-process of enforcement within Peru; evaluation, supervision, enforcement and application of sanctions and incentives, finally leading to more effective environmental protection. This works within the context of Peru, which has a strong mining industry (gold, zinc, other minerals) as well as fishing? and energy. In a case study, Dr. Becerra's presentation described the town of Espinar and the ways in which mining led to contamination and impacts on human health. OEFA has investigated the relationship between mining activities and exposure by conducting evaluations, analyses, and studies using innovative mapping, analysis, and visualization techniques and methods. Once more effective monitoring, evaluation, and contaminant identification can occur through these methods, more effective enforcement can follow.

Presentation: UAVs as a Tool for Supporting Environmental Enforcement

Gonzalo Tapia Koch, the Manager of Environmental Enforcement and Evaluation of Chile's National Forest Corporation (CONAF, using its acronym in Spanish), spoke next about the use of unmanned aerial vehicles (UAVs) for environmental enforcement. He explained that CONAF works for the protection of forests, including enforcement and compliance, especially with regard to illegal logging. He described UAVs as a potential tool to support enforcement activities through their ability to take photographs of remote areas, improving accessibility. UAV images can provide qualitative information such as real-time images. They can also bring a quantitative focus by capturing images and photos that can be processed to identify and capture data. The impact of industrial or mining projects can be visualized, a significant step in evaluating and monitoring environmental impacts. However, challenges remain. Images often require reanalysis to be usable. CONAF is also looking at developing geo-referencing systems and mosaics in order to obtain quantitative data through the images, though this is burdensome and requires a number of experts. Commercial software may be able to help automate this software, but it is expensive. Climatic conditions also present technical challenges to UAV functionality and electronic systems, such as high altitude, extreme temperature, humidity and precipitation, and salt. Overall, UAVs or drones can still be useful for a variety of applications: distinguishing

between rural areas and towns, reaching high elevation areas, working in restricted zones, and otherwise providing visual imagery of inaccessible places.

Presentation: Use of Submarine Film Equipment in SERNAPESCA's Environmental Enforcement Activity within the Region of Los Lagos

Nelson Pino, who works within the Environmental Management office of SERNAPESCA in the Los Lago region, Chile, presented on how his organization is using submarine film equipment for environmental enforcement. New technology can support marine enforcement in activities such as aquaculture and fishing. Cameras on submarines can capture or verify information such as water quality, contamination levels, and other physical data, as well as provide images of litter or waste. There are still limitations, such as battery life and lack of functionality in turbid or low-light water, but they are still an effective tool for use in enforcement, providing evidence for infractions.

Panel Discussion

The panel discussion began with a question regarding the costs in Dr. Becerra's study. The panelist noted that there were several types of studies being conducted to measure the contamination and the effects of the clean-up measures. The simpler studies cost approximately $25,000 USD while the more long-term and complex studies cost approximately $350,000 USD. The topography analyses incorporate several expenses, including the cost of the equipment ($40,000 USD), cost of tests ($10,000 USD), and the cost of having to employ a multidisciplinary team who can perform these tests and analyses, a cost which is difficult to quantify since they also work on other projects. The panelist explained that, when working with citizens to compile data, it takes approximately 7 months of time to implement a study. A lot of time is required to explain and train the local community on what to do and why it is necessary. For studies not involving citizens, a study can take as little as 3 weeks.

The next question asked was regarding Mr. Bustamante's monitoring technologies and if they have been used in legal cases successfully. Mr. Bustamante stated that to the best of his knowledge, there haven't been any legal cases that have admitted the data captured from these new technologies as evidence. However, he mentioned that companies are onboard with the use of the data captured from these technologies and accept the validity of the findings derived easing negotiations toward a settlement outside of court. The other panelists from Chile added that in Chile evidence captured by new monitoring technologies (e.g. drones) can be used as evidence in a court of law.

The final questions were asked of Mr. Schmitt from IBAMA regarding programs or agreements with other countries in relation to the Amazon region and about IBAMA's annual budget designated for the monitoring programs it currently runs. Mr. Schmitt stated that IBAMA's annual budget for the Amazon monitoring program is approximately $6 million USD. IBAMA's entire team of regulation enforcers consists of approximately 4,000 staff, but the Amazon program only has use of a small percentage of these employees. The spatial visualization program has 6 specialists working on it. Since 2009, IBAMA has been able to reduce the deforestation of the Brazilian Amazon by approximately 70% thanks to a combination of new environmental regulations and the implementation of new monitoring technologies. Brazil has agreements with the governments of Peru, Colombia, and Uruguay to reduce illegal mining and deforestation, among other things.

5. Module 3: Impacts of Electronic Reporting in Environmental Compliance

The second day of the workshop began with moderators Andrew Griffin and Paola Jara (of the SMA). They provided a brief introduction of the module and noted that use of electronic reporting seeks to improve enforcement and compliance by obtaining more and better information in real-time. As in module 2, individual presentations were given, followed by a panel discussion.

Presentation: Electronic Notifications and Reports

Davis Jones presented on the electronic notifications and reports being developed by the EPA. Mr. Jones noted that electronic systems are in use for banking, music, and movies, and should be leveraged for sharing information on environmental compliance information, as well. Digital tools can be used to share information for better understanding. In fact, in 2013 the EPA Administrator signed a rule stating that electronic reporting must be used for all laws and regulations. State and Federal officials must therefore work in concert to ensure that information is coordinated across agencies. Data must be integrated across systems. Big Data initiatives could bring together data on taxes, energy use, and physical environmental data, etc. However, data providers must utilize shared services where data can be shared publically. Electronic reporting brings many benefits, including: automatic correction of errors, application of consistent formatting, storage of historical data, and ease in updating processes. Mr. Jones presented two EPA tools as examples of successful e-reporting: Network Discharge Monitoring Report (NetDMR) and Waste Import and Export Tracking System (WIETS). However, these rely on consistent data submission and must include funding for operations and maintenance beyond the initial development costs. Regulations and current practices must emphasize or dictate e-reporting usage in order for it to be truly effective.

Presentation: PROCOF-SINAR Monitoring System Data from Sanitary Companies

Alfredo Espinoza, the Environmental Unit Chief, presented on ways in which the Superintendency of Sanitary Services (SISS, using its acronym in Spanish) uses e-reporting to regulate industries that provide sanitary services. SISS uses a tool for regulating contamination from the sanitary sector, such as water quality in reservoirs or potable water. Laws can then address enforcement and compliance needs. In this way, regulations and monitoring systems work hand-in-hand.

Presentation: National Information System for Environmental Enforcement: Characteristics and Challenges of SMA's Electronic Platform

Sebastián Elgueta, from SMA's Information Management Department, presented on the e-reporting system developed by the SMA: the National Information System of Environmental Enforcement (SNIFA, using its acronym in Spanish). SNIFA integrates historical information, current data, and publishable information in a way that is usable by the SMA staff, regulators, various sector stakeholders, data users, and citizens. The system was developed with users in mind and includes a platform for mobile devices using the Cloud and Big Data. SNIFA was developed to prevent silos of information from forming by not allowing distinct information

systems to remain separated. Since 2015, his department has looked at hardware, software, and the data and information itself to ensure that user experience, innovative interfaces, and new data are at the forefront of the tool. Challenges in electronic platforms persist, however, including the need for maintenance, licenses, information security, integration with other services, and the incorporation of new tools to help the enforcement process (such as satellite images, safe electronic signatures, and data validation).

Presentation: Advances in the Development of Electronic Reporting within the SMA: Next Steps

Juan Eduardo Johnson and Iván Honorato from the SMA presented information on the use of electronic systems. The SMA addresses various challenges in standardizing data to add to electronic systems, such as variability in variables, parameters, and methods, a lack of internal resources for investing, a lack of relevant regulations, the need to integrate existing systems, and building capacity for using the systems. To address these, the SMA is encouraging the standardization of formats for reports and sharing information more widely.

Presentation: Review of the Comprehensive Online Web portal for Environmental Procedures (VITAL, using its acronym in Spanish) and the Information System of Environmental Licenses (SILA, using its acronym in Spanish) as Tools for Centralized and Participatory Management for Permits and Environmental Licensing in Colombia

Leonardo Bayona Rodriguez, an administrator with Colombia's National Authority of Environmental Licenses (ANLA, using its acronym in Spanish), presented the systems that ANLA currently uses for managing data and information. In Colombia – political, technical, and administrative organizations work together within a national system, however harmonizing everyone's data can be difficult. Through an interdisciplinary team of actors, a strategy for standardizing systems and sharing information was developed. This included trainings and capacity building throughout the development of the current system, from design to implementation. The system, VITAL, was created to be a centralized, national system to implement environmental regulations and manage information. Time in transmission of information was reduced, use of paper removed, and access made simpler and easier.

Panel Discussion

This panel discussion began with a question regarding how SMA's Information Management team obtains the appropriate understanding of business needs in relation to system development. Mr. Elgueta stated that good planning and constant communication were key. He commented that his team spends a lot of time planning ahead, documenting procedures to reduce confusion, and documenting business needs as they prepare to develop new systems. His team is also in contact with the business units on at least a weekly basis to make sure what they are developing is going to meet their needs.

The next question was directed to Mr. Espinoza regarding the current compliance rate for Chile's regulation 609, which establishes emission norms to regulate pollution in Chile, and about transparency in publishing information about findings and sanctions. The panelist stated that the current compliance rate averages between 60 – 70%. He mentioned that they don't have data to calculate improvement in compliance before the regulations were implemented. As for transparency, the panelist mentioned that transparency is high intra-agency but limited in regards to the public. The public does have a right to request more detailed information about

any case but they must go through the proper procedure in submitting the request. The agency does report general indicators to the SMA on an annual basis.

The next question was regarding the ways in which EPA integrates data from independent programs on water, air, drainage, and other issues. Mr. Jones noted that it is a difficult task but they have devised a centralized tracking system which makes it easier for regulating agencies to correctly apply enforcement measures. The system allows for increased transparency.

The next question was directed at Mr. Johnson regarding the general experience of those being regulated when using the SNIFA system. The panelist commented that in general the adoption rate of the reporting systems by the public have been good. There have been instances where companies have not been able to use the systems and have ended up needing to submit their reporting via hardcopy for a handful of reasons, including: experiencing technical problems, user familiarity, etc. He mentioned that they are also aware that there are some limitations to using the systems, like for example submitting videos. Finally, he mentioned that the best results have occurred when the agency takes the time to communicate with the regulated community clearly about changes, instructions, and expectations.

The next question commended Colombia's VITAL program and inquired as to the resources required to operate it. Mr. Bayona commented that initially a pilot program involving a limited number of agencies was used to work out the problems as they simultaneously rolled out the program nationally and that this effort involved approximately 30 professionals. He stated that currently the team is composed of 10 fulltime staff dedicated to this program within ANLA.

The next question inquired as to how the EPA regulates companies that are not within their systems, especially with regard to water discharge. Mr. Jones commented that even though only a small percentage of companies are actively regulated, this does not mean the rest are off the hook. He mentioned that any company discharging residual waters has to apply for the appropriate license/permit and follow the stated regulations. He said that the government usually finds out of illegal discharging through public complaints. When these complaints come in the government investigates the company, checks to see if they have the required licenses, and if they don't, they investigate further and make a determination as to fines and whether or not to pursue criminal charges.

The next question inquired about how agencies are connected in SMA's online system for users. Mr. Elgueta and Mr. Johnson of the SMA explained that they have set up one web portal for users that connects them to all the relevant agencies. The user has easy and quick access to whichever agency they need to submit their reporting. As time goes on the number of agencies connected to this web portal will be increased.

The final question inquired as to panelists' use of social media. Leonardo Bayona stated that they have many ideas but have yet to implement any aspects of social media into their platform. Some of the ideas they have considered are using social media for geo-referencing of complaints and group chats to provide advice in real-time.

Sebastian Elgueta stated that they have excluded social media from their platform as they see it as more of an area for their Communications Department to handle, with the appropriate expertise. He mentioned that they did create a mobile version of their website in order to be more accessible to more users.

Alfredo Espinoza stated that his agency, SISS, envisions creating a mobile application so that the public can know what is happening in real-time, also allowing them to submit questions and

complaints. However, he mentioned that they were hesitant in making this investment due to the possibility that the adoption rate wouldn't justify the expense.

6. Module 4: Innovation in Environmental Enforcement

The final module of the workshop was introduced by Claudia Pastore of OEFA. She described the objective of the module as exploring new data sources, models, and methods for analysis.

Presentation: Environmental Epidemiology as Enforcement Support

Roxana Tessada, from the Ministry of Health in Chile, presented on managing environmental health risks. She described the environmental health risks around Chile, in particular exposure to arsenic and metals (from mining activities or proximity to landfills), especially among vulnerable populations like infants. Community level impacts are important to recognize; the government has created a plan for health studies related to metals, including epidemiological studies and occupational hazard studies, as well as educational efforts and air and water monitoring activities. Risk management should include research, sharing information, and clinical intervention. Once health impacts are determined, improvements should be incorporated into ministry efforts. This might involve identifying sources of danger, monitoring, enforcement, registering laboratories, or conducting additional research. Criteria for defining risk should be established with the exposure risk identified. Information management should share data on all of these elements through alerts, notifications, magazine articles, or bulletins.

Presentation: Development and Application of Remote Sensing Tools for Evaluation of Environmental Compliance in Chile and the Future Perspectives of the Use of Satellite Images

Ariell Russel of SMA's Information Management Department presented on the use of satellite images for use in environmental enforcement. He emphasized that environmental monitoring is critical for environmental management; drones and satellites can provide images to support this effort as well as outreach, education, and generally distributing visual information. Images allow for the evaluation of variables and their evolution. Satellite data can recognize changes in the environment or physical infrastructure. New collaborations across agencies are allowing for new hardware, software, and the application of new statistical analyses. For example, agriculture or marine aquaculture can be monitored using visualizations or quantitative analysis (data on turbidity, concentrations of contaminants, suspended solids, temperature, glaciers, or topography). Each data set presents unique challenges and may require additional research. Big Data initiatives are important due to the high volume of satellite data. Forecasting and predictive analysis could provide alerts in the future, but still needs further research, potentially in collaboration with NASA or the Copernicus program in Europe.

Presentation: Analysis of the Vegetation in Chile's Wetlands

Mario Ahumada, the Professional Manager of the Sub-division of Environmental Management of Chile's Agricultural and Livestock Service (SAG, using its acronym in Spanish), presented on the ways in which vegetation impact evaluation is conducted with innovative methodologies such as classification systems supported by remote sensing data. He noted that climate change is already impacting many wetland regions, and identifying risks with visualizations or quantitative measurements is important in understanding changes. Classification systems allow

categories or indices to be used for understanding physical characteristics such as salinity. Scientific evidence is always important, especially as it supports evaluation for enforcement. In fact, Mr. Ahumada emphasized that enforcement starts with evaluation using the scientific method.

Panel Discussion

This panel discussion started with a question for Ms. Tessada about the model she presented and the connections to institutions focused on environmental regulation. She commented that she envisions more collaboration with these agencies. She would like for public health officials to be an integral part in developing some of the regulations that impact human health. She did note there is already some collaboration.

The next question was also directed toward Ms. Tessada, inquiring how public health information is communicated to the local community by the public health ministry. The panelist commented that it is usually the case that the local community identifies the problem first and notifies the health ministry about it which then intervenes. When this is the case, public health officials' priorities are to investigate and communicate risks to the public. The situation quickly becomes a campaign to educate the public. One of the problems that has arisen is a question of credibility of the institutions by the public. Therefore, it is the Ministry's plan to be better at proactively educating the public.

Another question directed toward Ms. Tessada inquired if Chile has a national plan to eliminate lead poisoning. She noted that it does not, though Chile has begun regulating lead in consumer products, especially paint.

The next question was directed toward Mr. Russel regarding the images used and their availability to the public. He noted that most of the images his office uses were obtained from open data sources. Some of the sources are from the U.S. and Europe.

The next question was also directed toward Mr. Russel, inquiring about the acceptable level when measuring water contamination using the technology presented. Mr. Russel stated that the acceptable level varies and depends on the model being use to calibrate the findings.

The next question was directed to Mr. Ahumada in regards to the profiling of regions in the country and the setting of baselines before changes can be evaluated. The panelist stated that they currently profile regions using climatic characteristics. He proceeded to explain that when a wetland becomes contaminated that the type of contamination determines the effects on the vegetation. In most cases the vegetation dies off and desert-type vegetation recolonizes the zone.

Presentation: Methodologies for Evaluating and Monitoring Heritage Structures

Maria Cruz, an architect with the Council of National Monuments, described methods for evaluating and monitoring the physical health of heritage structures such as monuments, cathedrals, or sanctuaries. She noted that the protection of historical structures involves monitoring damage over time and the impact of nearby construction or development. Limits for assessing change must be established for each structure, based on certain characteristics. Monitoring is set up throughout pre- and post- construction so that monitoring and evaluation can occur seamlessly. Alert systems are utilized to ensure that parameters stay within set limits.

Presentation: Review of Colombia's Sanction Evaluation Model and how it meets the Membership Admission Requirements of the Organization for Economic Co-operation and Development (OECD)

Tania Torres and Claudia Lopez of ANLA in Colombia presented on how their organization models and determines fines for enforcement. They utilize categories and equations to determine fines calculated based on risk, frequency, intensity, size of area impacted, and persistence of contaminant in the environment, reversibility, and ability of environment to recuperate. Colombia has particular ways of conducting these calculations as well as defining the related violation and infraction. ANLA has compared these to other regional classification systems but they often differ based on local characteristics. Fines also vary depending on Colombian laws and regulations currently being enacted.

Presentation: OEFA Methods for Imposing Sanctions and Corrective Actions

Katherine Melgar of OEFA presented on Peru's goal for transparency when it comes to its relationship with the regulated community. To achieve this goal her office undertakes all activities with a focus centered around having open and clear dialogue with all actors involved; this means, clarity in all communications and publications so that the regulated community understands the laws, expectations, and sanctions – ultimately creating a relationship of mutual trust and, more importantly, compliance. She described in detail what her office does to make sure the regulated community understands the laws, how to remain compliant, and how sanctions and corrective actions are determined. Her office operates under the belief that there is a correlation between transparency and compliance.

Panel Discussion

The first set of questions were directed forward Ms. Cruz. The first was regarding the sanctions applied and legal procedures for dictating applicable fines. Ms. Cruz stated that the council does apply sanctions. If an action is determined to be egregious enough they will also be charged criminally. She added that procedures are documented and in place for this type of regulation.

A follow-on question to Ms. Cruz related to the cost of conducting structural monitoring of buildings. She commented that it varies widely based on the characteristics of the building. New technologies, such as satellite images or drone sensors, could add to the cost.

The next question was regarding Colombia's and Peru's budgets for selecting and investigating cases, then obtaining the appropriate data for applying sanctions. Claudia Lopez commented that it was difficult to answer this question since several things are out of her office's control, such as the power to decide who to investigate. She mentioned that it takes more than a year to start some of the investigations once an infraction has been determined to have occurred. There are administrative infractions that are sanctioned on a faster timeframe.

Katherine Melgar stated that the number of cases investigated per year varies widely and is determined by the results of inspections conducted on companies. She mentioned that her office's goal is to obtain 100% compliance by inspecting all units under supervision, but that this goal is still a work-in-progress. The criteria used to establish sanctions has been obtained through thorough research and technical analysis.

Tania Torres mentioned that in Colombia the criteria used to establish sanctions has also been developed through thorough research of the topic and technical analysis. The sanctions

established for offenders in Colombia emphasize the well-being of the environment over the economic outlook of private industry.

7. Conclusions

The workshop was concluded by Cristian Franz and Ruben Verdugo of the SMA. They reviewed the five components of *Next Generation Compliance Strategy* and challenged the audience to consider how new ideas would be implemented in the future. They encouraged the audience to consider using new technologies such as satellite images and incorporating health models, as was discussed in the workshop. They noted that there is always space for strengthening abilities through networks such as RENFA, REDSUFICA and others, and that professionals should work across borders on new models, methods, and strategies. The environment does not have borders and neither should enforcement and compliance, or environmental management more broadly. Prevention, new methodologies for evaluation, and new laws should be leveraged to improve enforcement and compliance. The presentations shared here bring an international context to how the region is addressing *Next Generation Compliance* with new technologies, new methodologies, and strategies.

The workshop ended with a final thanks to all local and regional collaborators, as well as the EPA.

8. Appendix A: Agenda

Seminario Internacional

Nuevos enfoques de la fiscalización ambiental

1. PRESENTACIÓN

Los problemas ambientales en los últimos años se han incrementado en complejidad y alcance, generando mayores impactos al entorno, e incluso sinergias entre éstos, siendo necesario para su control y seguimiento que las autoridades competentes adopten enfoques cada vez más innovadores. En consideración a lo anterior, varias agencias ambientales han comenzado a trabajar en el desarrollo de herramientas y estrategias que buscan identificar de forma temprana y oportuna, las alteraciones al medio ambiente, con la finalidad de propiciar el cumplimiento de la normativa ambiental por parte de los distintos actores regulados, para de esta manera asegurar la protección del medio ambiente y la salud de las personas.

Esta nueva línea de trabajo en materia de gestión ambiental, es conocida a nivel mundial como "Next Generation Compliance", la cuál ha sido impulsada por organizaciones como International Network for Environmental Compliance and Enforcement (INECE) y Environmental Protection Agency de Estados Unidos (US-EPA).

Este nuevo enfoque, se basa en cinco componentes que se interconectan entre sí; i) Diseño normativo y regulatorio (Design regulations and permits); ii) Desarrollo de tecnologías avanzadas para la detección de contaminación *(Advanced emissions/pollutant detection technology)*; iii) Implementación de reportes electrónicos sobre variables ambientales *(Eletronic reporting);* iv) Transparencia de la información ambiental *(Transparency);* y v) Innovación en la fiscalización *(Innovate enforcement)*.

"Next Generation Compliance" aborda entonces el diseño regulatorio en base a los nuevos avances tecnológicos, propiciando la investigación y desarrollo de nuevas tecnologías para controlar, monitorear y mitigar la contaminación ambiental a través de herramientas y metodologías más certeras, eficientes, y en tiempo real. Además esta nueva mirada, busca que se sociabilice la información generada mediante el involucramiento de actores sociales en la regulación ambiental local.

En este contexto mundial, la **Superintendencia del Medio Ambiente** se ha propuesto llevar la fiscalización y cumplimento ambiental nacional que efectúan los organismos conformantes de la **Red Nacional de Fiscalización Ambiental – RENFA**- a estándares internacionales, plasmando los enfoques vanguardistas en el quehacer de las entidades fiscalizadoras chilenas en materia ambiental.

En base a la anterior, la Superintendencia del Medio Ambiente desarrollará el Seminario de **Nuevos enfoques de la Fiscalización Ambiental**, el cual tiene por objeto crear una instancia para que actores de la Red Nacional de Fiscalización Ambiental, y actores internacionales, miembros de la Red Sudamericana de Fiscalización y Cumplimento Ambiental (REDSUFICA) y otros países latinoamericanos, compartan sus experiencias, desarrollos tecnológicos, metodologías y resultados obtenidos en los último años que se enmarquen la lógica del "Next Generation Compliance".

2. FECHA Y LUGAR DE REALIZACIÓN

El Seminario se desarrollará los días **9 y 10 de agosto de 2016**, en Hotel Plaza San Francisco, el cual se encuera ubicado en Av. Libertador Bernardo O´Higgins 816, Santiago Centro. Para mayores antecedentes visitar http://www.plazasanfrancisco.cl/.

A continuación se adjunta programa.

PROGRAMA SEMINARIO INTERNACIONAL "NUEVOS ENFOQUES DE LA FISCALIZACIÓN AMBIENTAL"

Horario	MARTES 9 DE AGOSTO
9:00 - 9:40	Recepción y Acreditación de participantes
9:40 - 9:50	**Inauguración y palabras de bienvenida Superintendente del Medio Ambiente,** Sr. Cristian Franz T.
9:50 – 10:00	**Palabras de bienvenida Ministro del Medio Ambiente** Pablo Badenier M.
10:00 - 10:10	**Palabras de bienvenida Embajador de USA en Chile** Michael A. Hammer
10:10-10:15	**Módulo 1: Nuevos enfoques para la fiscalización y cumplimento ambiental: Desafíos y Oportunidades**
10:15-11:15	**Plenario: Desafíos y oportunidades desde miradas locales** -**Cristian Franz T.,** Superintendente del Medio Ambiente (SMA), Chile. -**Gianfranco Mejía,** Director de Fiscalización, Sanción y Aplicación de Incentivos, Organismo de Evaluación y Fiscalización Ambiental (OEFA), Perú. -**Andrew Griffin**, Director Oficina Regional para Medioambiente, Ciencia, Tecnología y Salud para Sudamérica. -**Cristian Bowen**, Subsecretario de Transporte, Ministerio de Transporte y Comunicaciones (MTT), Chile. -**José Miguel Burgos**, Director Nacional Servicio Nacional de Pesca y Acuicultura (SERNAPESCA), Chile. -**Jair Schmitt**, Coordinador General de Fiscalización Ambiental de IBAMA, Brasil. Moderador: Pablo Gutierrez V.
11:15-11:45	*Coffee break*
11:45-12:15	**Charla Magistral: "Estrategias de Nueva Generación de Cumplimiento"** Davis Jones, Director División de Aseguramiento de Cumplimiento Internacional, Oficina de Cumplimiento y Fiscalización Ambiental, US EPA.
12:15-12:30	**Ronda de preguntas**
12:30-13:00	**Presentación Módulos**: Rubén Verdugo, Jefe División de Fiscalización, SMA.
13:00-14:30	*Almuerzo Libre*
14:30-14:45	**Módulo 2: Desarrollo de herramientas para la fiscalización ambiental.** **-Introducción, presentación expositores.** Moderadores: Juan Eduardo Johnson, SMA – Profesional ANLA.
14:45-15:10	**Tecnología Avanzada de Monitoreo de las Emisiones de Aire**. Armando Bustamante, Ingeniero Ambiental, Centro Nacional de Investigación Ambiental US EPA.
15:10-15:35	**Fiscalización automatizada de restricción vehicular de vehículos catalíticos, el caso de Santiago de Chile**. Paula Flores, Secretaria Ejecutiva de Fiscalización de Transportes, Ministerio de Transportes y Telecomunicaciones, Chile.
15:35-16:00	**Fiscalización ambiental de la deforestacion en la Amazonia desde la perspectiva de la próxima generación de cumplimiento.** Jair Schmitt, Coordinador-General de Fiscalização Ambiental, IBAMA, Brasil.
16:00-16:25	*Coffee break*
16:25-16:50	**Estudios especializados en áreas de actividad minera en el Perú.** Giuliana Becerra, Directora de Supervisión y Evaluación, OEFA, Perú.
16:50-17:15	**UAV como herramienta de apoyo en la fiscalización ambiental.** Gonzalo Tapia Koch, Profesional Gerencia de Fiscalización y Evaluación Ambiental, CONAF, Chile.
17:15-17:40	**Uso de equipos de filmación submarina en la fiscalización ambiental de SERNAPESCA, región de los Lagos.** Nelson Pino, Profesional Programa Gestión Ambiental, región de Los Lagos, SERNAPESCA, Chile.
17:40-18:10	**Ronda de preguntas**

PROGRAMA SEMINARIO INTERNACIONAL "NUEVOS ENFOQUES DE LA FISCALIZACIÓN AMBIENTAL"

Horario	MIERCOLES 10 DE AGOSTO
9:00 -9:30	Acreditación de participantes
9:30-9:45	**Módulo 3: Impactos de reportes electrónicos en el cumplimiento ambiental.** **-Introducción, presentación expositores** Moderadores: Andrew Griffin, Oficina Regional USA - Paola Jara, SMA.
9:45-10:10	**Notificación y Reportes Electrónicos.** Davis Jones, Director División de Aseguramiento de Cumplimiento Internacional, Oficina de Cumplimiento y Fiscalización Ambiental, US EPA.
10:10-11:35	**Sistema PROCOF-SINAR Monitoreo datos empresas sanitarias.** Alfredo Espinoza, Jefe Unidad Ambiental SISS.
10:35-11:00	**Sistema Nacional de Información de Fiscalización Ambiental: características y desafíos de la plataforma electrónica de la SMA.** Sebastián Elgueta, Departamento de Gestión de la Información, SMA.
11:00-11:25	*Coffee break*
11:25-11:50	**Avances en el desarrollo de reportes electrónicos de la SMA, próximos pasos.** Iván Honorato – Juan Eduardo Johnson Profesionales División de Fiscalización, SMA.
11:50-12:15	**Aplicaciones en línea VITAL (Ventanilla Integral De Trámites Ambientales En Línea) y SILA (Sistema de Información de Licencias Ambientales) como herramientas de gestión centralizada y participativa para el trámite de permisos y licencias ambientales en Colombia.** Leonardo Bayona Rodriguez, administrador funcional del Área de Tecnología, ANLA, Colombia.
12:15-12:50	**Ronda de preguntas**
12:50-14:30	*Almuerzo Libre*
14:30-14:45	**Módulo 4: Innovación en la fiscalización ambiental** **-Introducción, presentación expositores** Moderador: Claudia Pastore – Profesional OEFA
14:45-15:10	**Epidemiología Ambiental un Apoyo a la Fiscalización** Roxana Tessada, Profesional Subsecretaria de Salud, Chile.
15:10-15:35	**Desarrollo y aplicación de las herramientas de la percepción remota en la evaluación del cumplimiento ambiental en Chile y las perspectivas futuras del uso de imágenes satelitales.** Ariel Russel, Departamento de Gestión de la Información, SMA.
15:35-16:00	**Seguimiento de vegetación azonal en humedales.** Mario Ahumada, Profesional Jefe subdepartamento de Gestión Ambiental, SAG, Chile.
16:00-16:25	*Coffee break*
16:25-16:50	**Metodologías para evaluación de monitoreo en estructuras patrimoniales.** Mara Cruz, Arquitecto SEIA Consejo de Monumentos Nacionales.
16:50-17:15	**Aplicación del modelo de tasación de multas en Colombia y su contribución al proceso de inclusión de Colombia en la OCDE** Claudia Lorena López, jefe Oficina Asesora Jurídica, ANLA Colombia Tania Alexandra Torres, especialista en procesos sancionatorios ambientales, ANLA, Colombia.
17:15-17:40	**Metodologías para la imposición de sanciones y medidas correctivas por parte del Organismo de Evaluación y Fiscalización Ambiental (OEFA).** Katherine Melgar, Coordinadora de Proyectos normativos, OEFA, Perú.
17:40 - 18:00	**Ronda de preguntas**
18:00-18:15	**Evaluación y palabras de cierre** Sr. Cristian Franz T. - Rubén Verdugo C. SMA.